FIRST STAGE LARVA.

By Rev. Desmond Murray.

(Plate VI.)

It is true to say that the great majority of the larvae of our native moths, at full growth, are now known, this stage having been studied and figured by a number of workers. This is not true, however, of the early stages. In other words, although there is still a large field of study with reference to the full-grown larvae, the early stages are comparatively unknown. The egg and the first instar are often the most interesting stages, as well as being the most enlightening in the study of the phylogeny.

From all the books you may be able to consult you will find very little information about these stages. There is no work, for instance, on the ova, those beautiful little objects, so exquisite in their construction, so wonderful in their variety of form and colouring. The first stage larvae are even less known. The genitalia of all our moths have now been figured and this study has considerably helped to correct classification; some hold that it is essential, but the early stages yet remain to be figured and described.

A much closer study then is warranted of these stages, if a complete knowledge is to be gained of the insect's whole life. Correct drawings need to be made of the egg and first stage larva—they are often too small to photograph—until this great unknown field of work is exhausted. These studies will, no doubt, reveal many hitherto unsuspected facts.

With these points in view, a few notes have been put together on several examples, taken at random, without any particular order of families or species, examples that offered themselves from time to time. The comparison of even these few examples shows us, as I think all will admit, that there is a vast field of interesting and instructive work still at hand for those who have energy to pursue it.

(1) *Platyptilia gonodactyla.*—The egg is a tiny object laid singly on the underside of the leaf of the food-plant; dullish white at first, in colour, without any surface pattern, turning pale green later, then to yellow or bronze, before the larva emerges in ten to twenty days. The development seems to be a very slow one, moisture, as with all ova, being essential to development. The larva on emergence measures something over only ½ mm. in length, white or yellowish in colour, with regular setae on the segments; head black and strongly formed. The head of all first stage larva is the most prominent feature, the centre, so to speak, of its whole life. The larva buries itself in the soft texture of the leaf and so reaches full growth. [In the case of *gonodactyla*, the subsequent method of feeding depends on the brood; eggs laid, viii-ix, give larvae which at first are leaf-miners, then burrow down into the stem and hibernate and in April feed on the flower-shoot and pupate inside the flower: from eggs laid in vi the larvae feed on the underside of the leaves, and pupate there.—T. B. F.]

(2) *Perizoma flavofasciata.*—The egg is distinctly yellow or orange in colour, with a delicate surface pattern, large for the size of the moth, laid singly on the flower calyx of the food-plant. The larva

emerges after nine or ten days, according to temperature (see *Ent. Record*, Vol. III, 1892, p. 173 and 255: " The Geomt. Duration of Ova State " (with tables)). On emergence it measures about 1 mm., yellowish in colour, protected by fine setae all over the body; head black. It burrows into the calyx of the flower, remaining within to full growth, protected as in a kind of tent.

(3) *Geometra papilionaria*.—The eggs are laid singly on the leaf of the food-plant, in colour whitish at first, changing to greenish-yellow and then to pink; the larva emerges in six or seven days. It then measures about 1 mm., and is a very different object from the better-known, full-grown larva; sooty-black in colour with a strongly-formed reddish-brown head, the segments being armed with blunt-headed setae. After feeding from July to October, the larva hibernates until the following Spring.

(4) *Polia chi*.—The eggs are laid generally in little clusters on the food-plant. They are beautiful objects, yellowish at first in colour, turning later to a crimson-brown, shot with darker markings. The egg is deeply ribbed and reticulated. Laid generally in September, they do not hatch until the following April. On emergence the larva measures about 1 mm.; dull whitish to green in colour, head brown. The larva selects a variety of food-plants. At this stage it is very active and especially interesting, for although the abdominal legs are present in a rudimentary form, they do not develop until the second or third instar, the front legs and hind claspers alone being used. This gives it the appearance of a " looper " caterpillar; it also rests like a Geometer, with extended body. This peculiar feature is to be found with other Noctuae larvae as *Aplecta advena* and several others. This peculiarity may have been noticed before, but no explanation seems to have been given for its being, to all appearances, a Geometer in the first two larval instars and a Noctua in the egg, pupa and imago.

(5) *Dicranura vinula*.—The eggs are laid either singly or two or three together on the leaf of the food-plant. They are button-shaped, a rich brown in colour (sometimes of a buff tint and these eggs produce a lighter-coloured larva). The egg is convex above with a small pit at the apex and a finely grained surface. It closely resembles a fungoid growth found on the leaves of sallow and other trees. The larva hatches out in three weeks or less, generally in May-June; measurement 2 mm. It is certainly a fearsome object, being armed with horns on the head, sharp spines over the body, and spinous tails from which protrude whips, to warn off parasitic flies and other enemies. The larva is at first black in colour, the horns and tails reddish-brown, the whips carmine. It passes through five stages to full growth, resting from four to five days each time; the colouring at each stage is distinct from the previous one. By degrees it loses its armour (except the long tails) and in the third stage assumes a much milder appearance and less aggressive attitude at full growth. In all its stages the protective resemblance to the black withered edges of the leaves is very striking. Dr Chapman many years ago noticed that at each ecdysis the larvae not only eat the cast-off skin but the portion of the leaf on which silk was spun; in some way this is, no doubt, good for the health of the larva. In spite of its armour this larva is very subject to attack by ichneumon flies and similar enemies. Seven different species are recorded by

Bignell. One species, *Paniscus testaceus*, lays its black eggs on the nearly full-grown larva, on the second segment, just above the thoracic legs. The larva completes its cocoon but does not reach maturity. At full growth *vinula* is a very well-known larva.

EXPLANATION OF PLATE.

Egg and Larva—First instar.

(1) *Platyptilia gonodactyla*, × 50.
(2) *Perizoma flavofasciata*, × 40.
(3) *Geometra papilionaria*, × 25.
(4) *Polia chi*, × 35.
(5) *Dicranura vinula*, × 25.

THE OCCURRENCE OF CUCULLIA SCROPHULARIAE IN BRITAIN.

By A. J. Wightman, F.R.E.S.

Under this heading Mr E. P. Wiltshire, in the October number of the *Entomologist's Record*, asserts that the French and Belgian entomologists take and distinguish this species in the larval stage.

So did we in England, where it was considered anything but scarce, until doubt was cast upon its existence as a species distinct from *verbasci* or *lychnitis*. Then after its champions had told us all they knew about it, it became obvious that the characters and statements upon which it was founded were entirely unconvincing.

The French and Belgian collectors think and assert that they get the species we all know. The German collectors and dealers also claim to get it in abundance and so they should. The original account of *scrophulariae* says it occurs near Vienna on *Verbascum* (Del. *Scharst*, Vol. VI, pp. 131, 133).

The collectors of these countries have known for upwards of 50 years that we wanted proof of what *scrophulariae* was, so why did not they enlighten us if they could?

From the first the species has been supported by statements which have been unsupported by any character which could be found, and it is impossible to disprove the existence of a species no one has attempted to prove exists. Hence the long run of doubt.

Now Mr E. P. Wiltshire comes forward and says that he knows there is such a species. Will be please give proof of his assertion?

There are a number of well-distinguished Cucullias in the group on the Continent, and it may well be that *scrophulariae* is the prior name for one of these (possibly *lychnitis*), which has enabled the fable, I believe, to linger there longer than here, where having only two species with which the supposed *scrophulariae* could be confused, a conclusion has been much easier.

The three species, if there be three, in this triangle: *verbasci*, *lychnitis*, *scrophulariae*, all occur in the same areas and eat the same food-plant, so absence of genital characters would surely be conclusive in this case.

So far we have not an iota of proof as to *scrophulariae* being a good species, but I trust Mr Wiltshire is able to enlighten us with some facts that can be proved.